

Octal Subtraction

Octal subtraction is similar to decimal subtraction but is based on the octal number system, which uses digits from 0 to 7. If the number being subtracted (subtrahend) is larger than the number it's being subtracted from (minuend), borrowing from the next higher place value is required.

Rules of Octal Subtraction:

1. Subtract column by column from right to left.
2. If the digit in the minuend is smaller than the corresponding digit in the subtrahend, borrow 1 from the next column to the left. In octal, borrowing 1 means adding 8 to the current digit.

Example:

Let's subtract two octal numbers: $642_8 - 375_8$

Step-by-step process:

1. Subtract the rightmost column (units place):

$$2 - 5$$

Since 2 is smaller than 5, we need to borrow 1 from the next column. Borrowing 1 in octal means adding 8 to 2, making it 10_8 . Now:

$$10 - 5 = 5$$

2. Subtract the next column (tens place), accounting for the borrowing:

After borrowing, the original 4 is reduced by 1, making it 3. Now subtract:

$$3 - 7$$

Again, since 3 is smaller than 7, we need to borrow 1 from the hundreds place. Borrowing 1 gives us $3 + 8 = 11_8$. Now:

$$11 - 7 = 4$$

3. Subtract the leftmost column (hundreds place), after borrowing:

After borrowing, the original 6 becomes 5. Now subtract:

$$5 - 3 = 2$$

Final Result: $642_8 - 375_8 = 245_8$